

Thesis 20/03/2012

*z-buffering, an informal inventory of avant-garde
imaginery of 20 and 21 century.*

THESIS OUTLINE

Driven by my research on experimental moving images and screening devices I propose to catalogue a bunch of ideas regarding aesthetics on contemporary imagery.

This inventory allows me to analyze the actual conception of images, where the ideas come from and where and how are they being aimed, so I'm also gathering past outcomes and new challenges on images.

Far from being a methodical history research, my idea is drive the data I want to compile through my own experiences, memories and concerns, no necessary contrasted and argued as a scientific research but much more as a DIY epistemological analysis. My work on LBDM, focused on space-time coordinates on moving images, is the *leit motiv*, which articulates a collage of text and images.

PROJECT RECAP

My project starts with the will to transcend my own understanding and expectations in relation to imagery, which is the most remarkable trail in my career as researcher. After being involved in different previous projects I realized that the logical next step of my work is to go further in understanding the physics of lenses and cinema display, which is truly the ground of my knowledge and the keystone for my specific researches in videography. As a student and artist I want to be able to set up original experiences in moving images, working with specific and self-invented methodologies in order to try to achieve them properly.

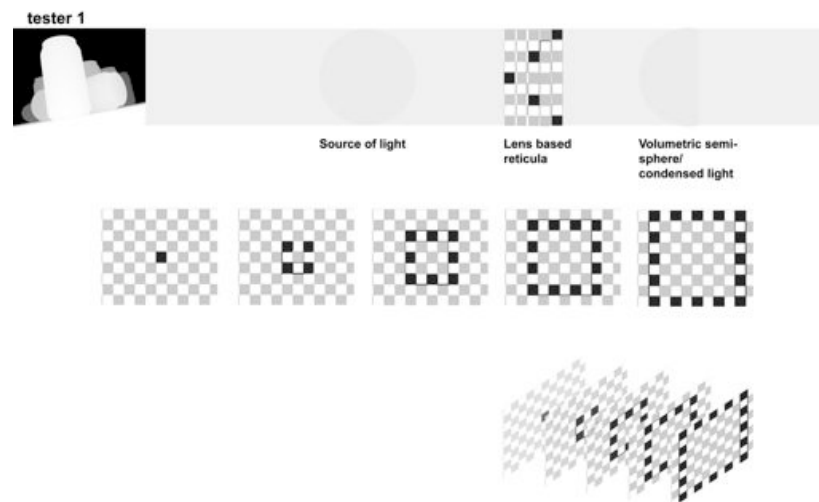
I propose to improve and materialize my skills regarding videography in a new self-built and DIY oriented screening device: a lens-based hologram, involving lights, lenses and avoiding any surface of projection. Basically I'm presenting a multi-channel screening which is ordered in a certain way in order to achieve a true 3d volumetric experience. The hologram I want to achieve is not involving mirrors or lenticular surfaces but a high-density air medium, which means strictly smoke-saturated air.

The goal is to push myself and the audience to an extraordinary and unexpectable experience in imaging due to the singularity of its inherent features. I want the audience watching an extraordinary object the main main characteristic of which is its basis on basic natural physics.

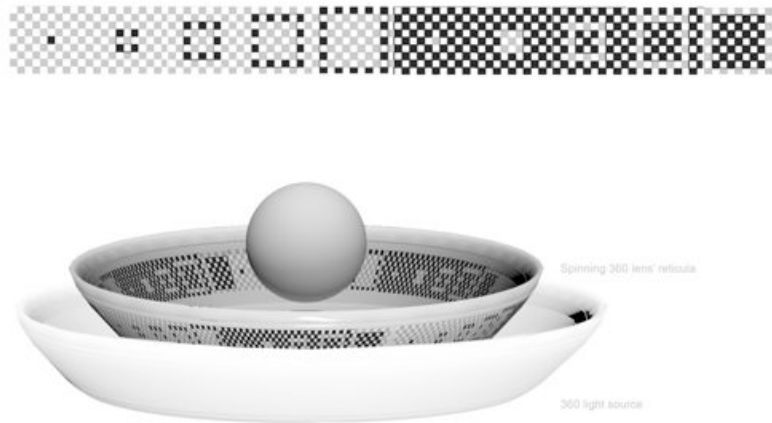
"[T]he invention of an hypothesis in order to explain a certain natural process, then the arranging of conditions under which that process may intentionally be brought about in accordance with the hypothesis, and finally, the justification or refutation of the hypothesis, depending on the outcome of the experiment".

From Picatrix, regarding the scientific experiment method.

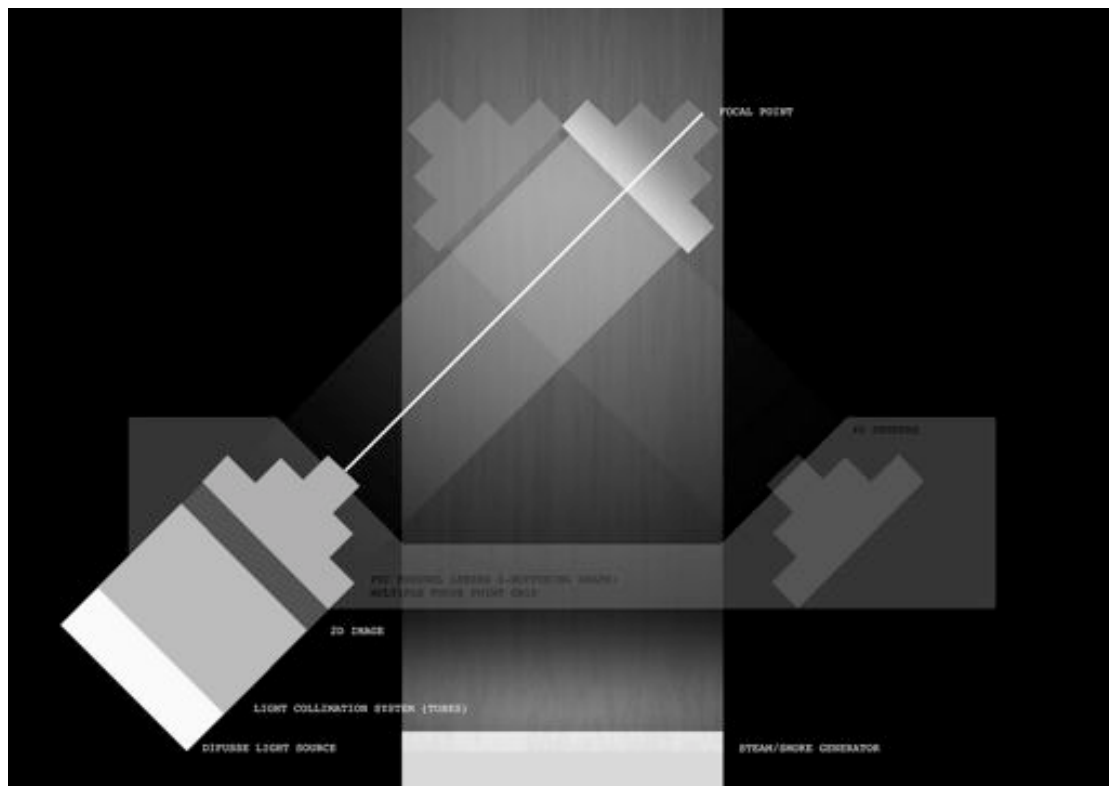
Basically the idea is to work with a grid of concentrated-light pixels attached to a source of light in which each pixel, further than depict colors and luminance also describes the depth relative of those pixels onto space (z axis). Each light pixels is formally a tube, that actually works as simple collimation device, that also has a plano-convex lens in a specific distance from the source of light. In that way, the more is complex the grid, the more It'll be able to concentrate points of light following an specific order in the three cartesian axis of the space (x,y,z).

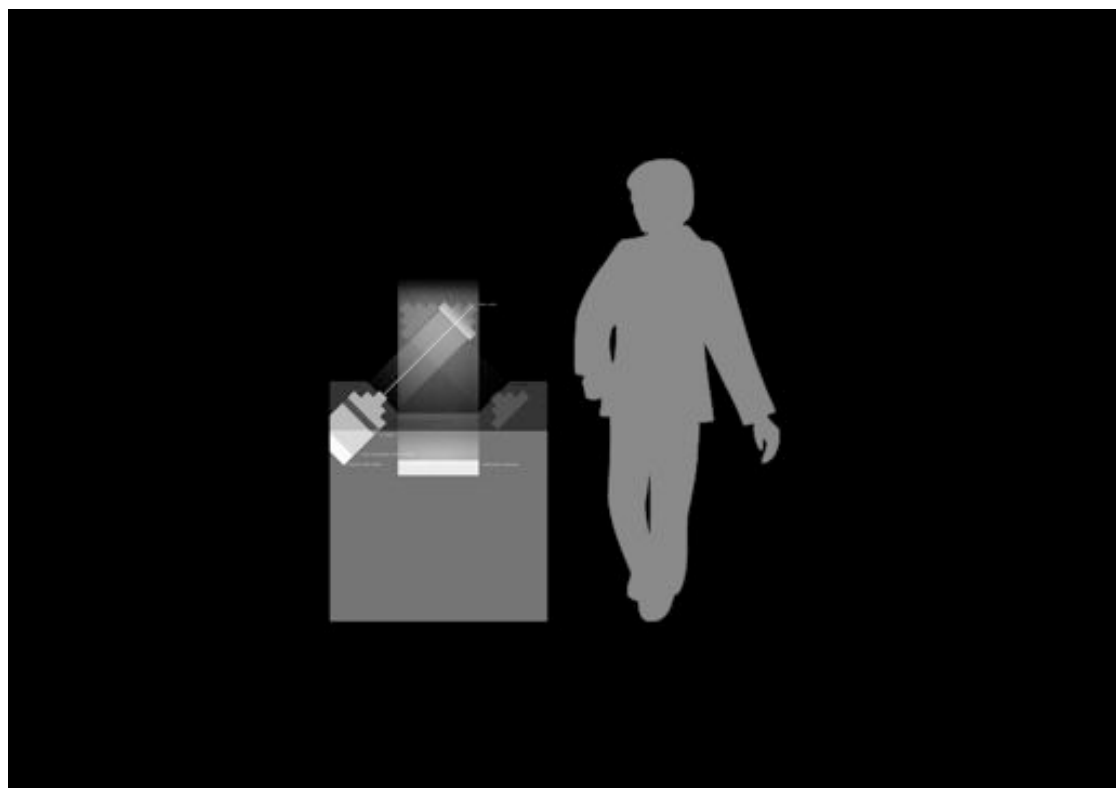
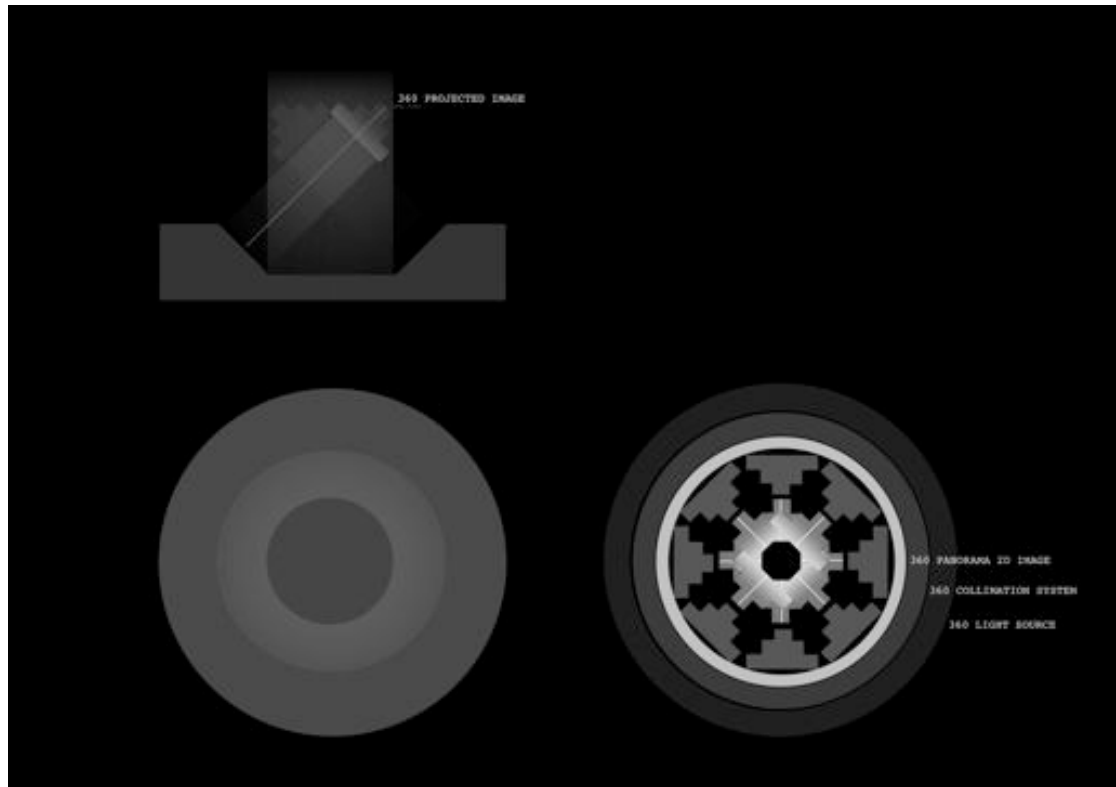


Tester 2



Through the sketches I've been working on the formal qualities of the device, being able to analyze all the elements involved before the materialization of it. The showed sketches, chronologically ordered, can express how I've been focusing my ideas from the concept design until the first real testers.





TESTER 1

Still frame DIY projector, 2 units.

Once finished my research on affordable materials I decided to start building a prototype of the self-made beamers I want to use. As you can appreciate in the previous images I need multiples sources of images so consequently I developed a easy-to-do, replicate and transform cardboard functional model.

For my first test I didn't apply the depth map on images although the device is prepare to allow on it a multilayered film, which will be the core of the second test.

Curiously, built up my own projector shape some ideas regarding z-buffering in an unexpected and extremely positive way. Until the beginning of the experiments I always thought on depict the depth mask of my images by creating a grid of multiples Fresnel lenses displaced in relative distances along the z-axis. However, analyzing the qualities of my projector, is obvious that the depth should be depicted directly in a multilayered frame, that makes the object and the process much more affordable.



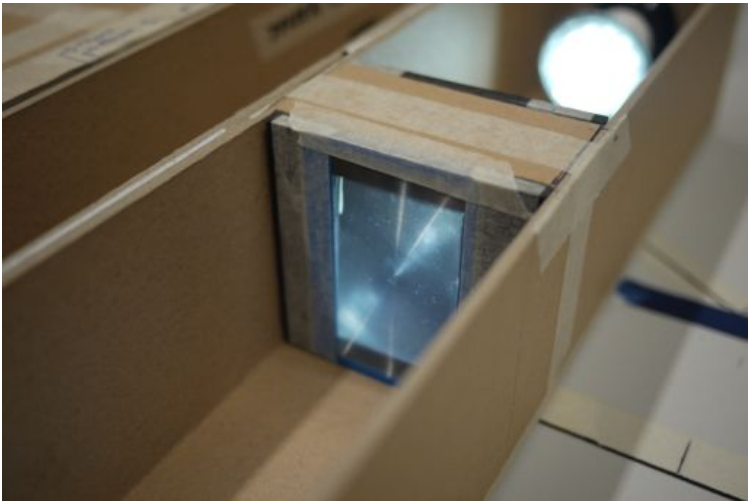


The bulb cast a beam of light onto a white diffusion frame, the diffused light incises on a Fresnel lens, which condense the light, through the frame that contains the image. The beam is finally projected due to a combination of a second Fresnel lens and a magnifying glass. I observed that a third Fresnel lens between the two optical elements is helpful in order to remove vignette effect and chromatic aberration (produced by low-quality lenses).



The basic materials are: a LED bulb, a white diffusion photofilter (paper), a magnifying glass and two pocketsize acrylic Fresnel lens. The body and frames are made by card board and foam board, the size of the device is conditioned by the lenses' size. No part has been glued; all the frames can very easily moved and fixed again.

Since my goal was to set up the basic elements on projecting flat images as quick as possible I didn't built on it the collimation system. However the inherent form of the device and the qualities of the Fresnel lenses made the light beams in a pretty straight way. For further experiences I'll add that, which is basically a grid of tiny tubes, in the space between the bulb and the white diffusion sheet. That space have been respected for that purpose and, after work with the features of LED bulb, I realized that a main white diffusion filter should be added before the light goes on the collimation system otherwise I'll get some gaps on light intensity and what I need is a constant casted light on all over the surface.





PARALLAX TEST

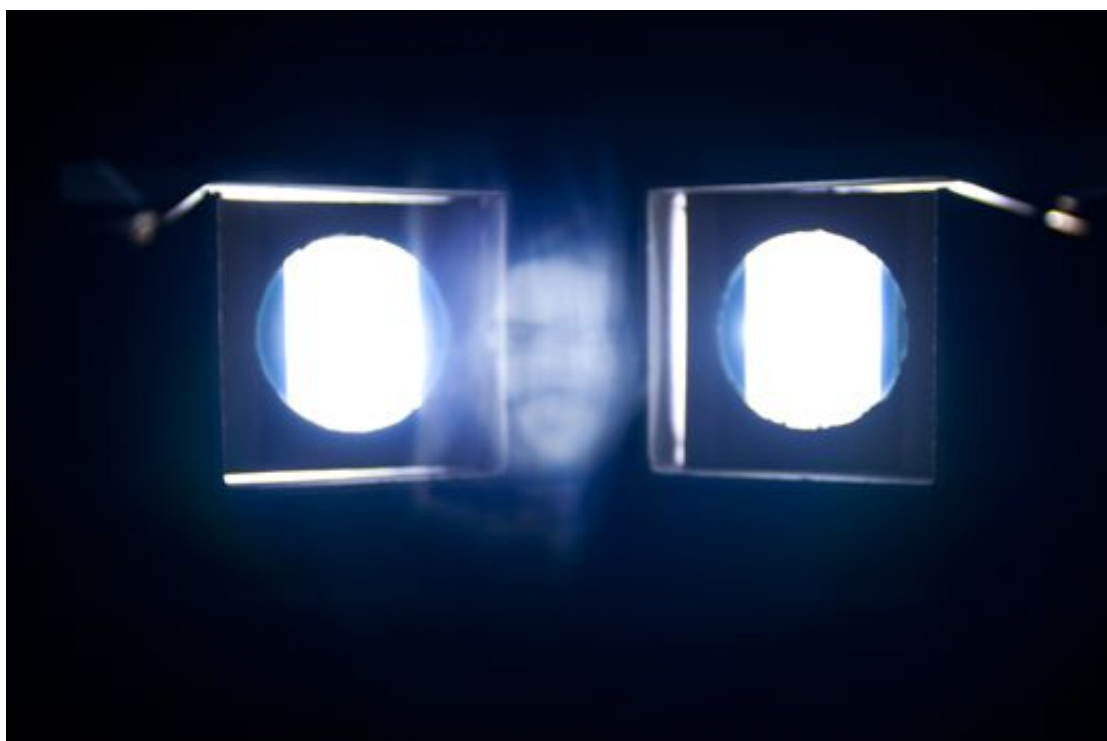


After finishing the two projectors I decided to engage myself in a simple test: project a dual angle image on a column of steam in order to achieve the illusion of parallax in the projected "stereographic" image.

As mentioned before that test doesn't depicts depth mask properties yet as the goal is just perceive the parallax in a stand-alone projection by moving slightly around the projection space.

The focal plane is actually set at 16,5 cm; the size of the projected image is almost the same as the framed print (5,5 x 3,7). The selected image for the experience is a self-portrait "stereography" quickly achieved used a webcam and easily hand-painted in an acrylic sheet.

The ray of light extends on space, but both focal plain as condition of the smoke medium will create the illusion of a figure on air.



EVALUATION



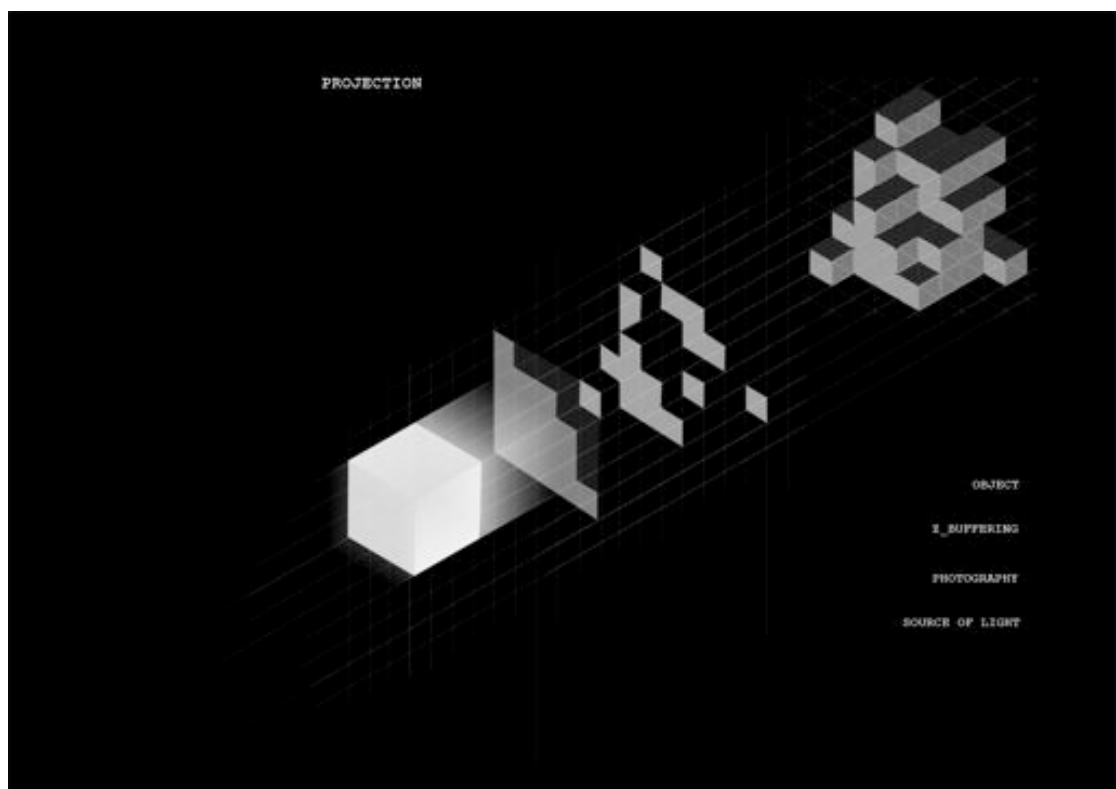
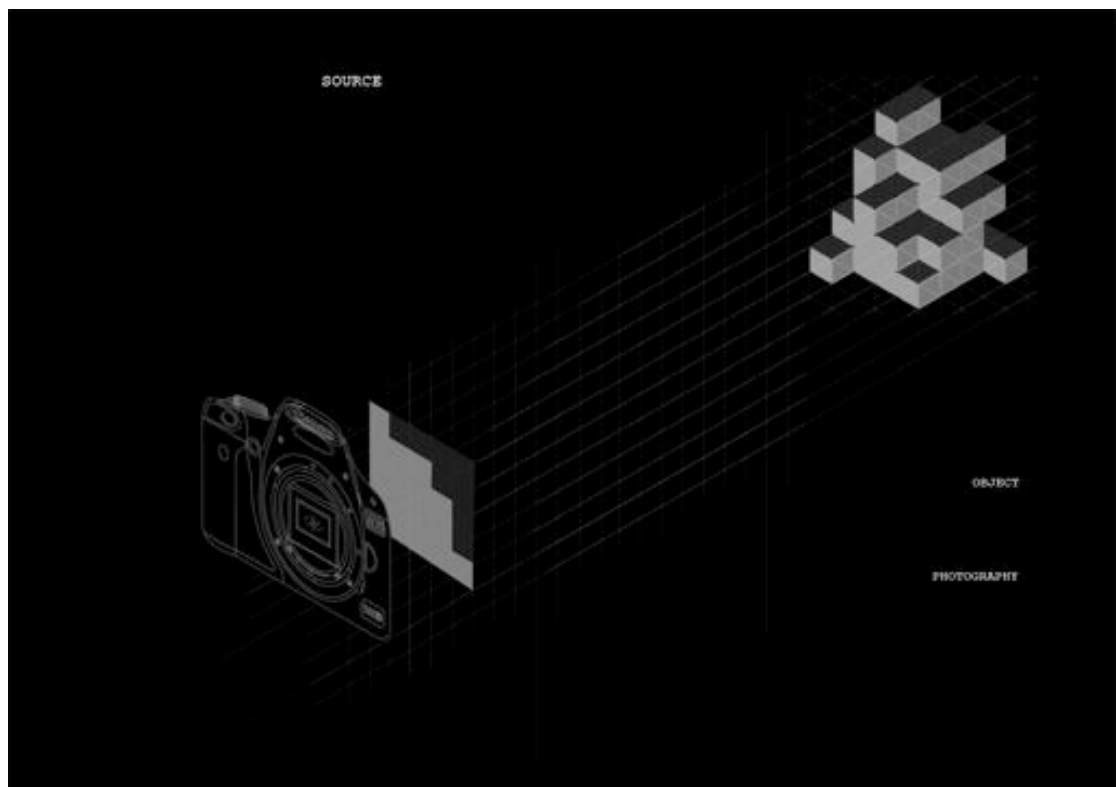
Although the experience was successful and the parallax perceived I want to move further and execute a second test improving the same parameters.

The main problems I want to fix are the instability of the smoke medium (is really difficult to appreciate the qualities of the images on a tiny and moving column of steam) and the roughness of the source image (hand painted acrylic). Also I realized that triangulating a stereography is not easy as I expected so a better approach for imaging should be done: the angles are wrong (too forced binocular disparity).

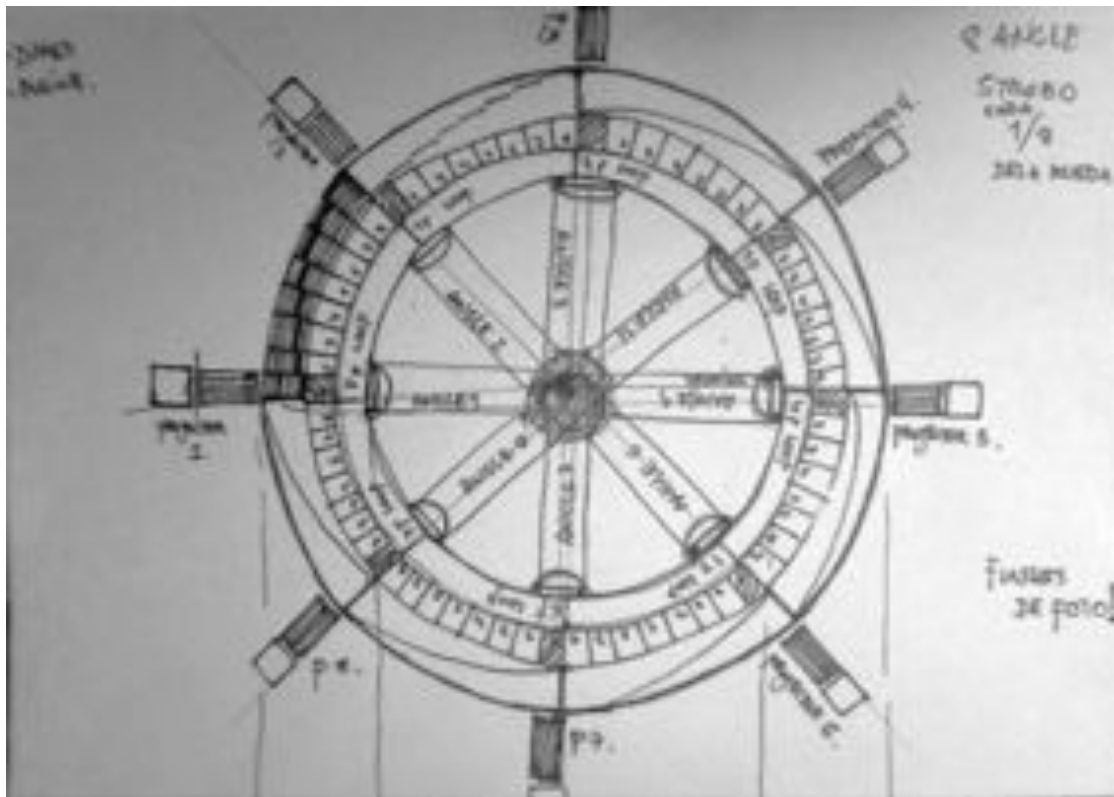
As conceptual deduction I should establish a discrepancy with others stereographic practices. Here's not involved any "brainy" process of gathering two images trough parallax but simply perceive the unified projection just moving to one angle to another. And definitively that's the main goal: a true holographic illusion in which the object is formally in front of you and could be touched. So, the stereopsis is relative, as I'm not using the binocular disparity but on the other hand those values of stereopsis are applied to the images sourcing process.

NEXT TEST

1. More projectors (total of 4-5 units). Each one has a cost of approximately 15 euros.
2. Improve the smoke medium. I've been doing research on it and I'll buy an ultrasonic humidifier, which basically atomize water using a high frequency vibration; the smoke that produces is dense and finally disappears in air, which is just perfect as I want to be able to control the shape it takes and work in a clean environment (trying to avoid traditional smoke machines and be obliged then to work in a foggy place).
3. Keep the actual subject (self-portrait) but use color photos and better axis-angles values.
4. Develop the depth mask on each one of the images. The expected mask will be processed in Photoshop, cutting out planes on z-axis and isolating the data that is relative to those planes in different layers to be physically and sequentially over posed. The expected outcome is a progression of focal points on z-axis that could be noticeable in the saturated smoke medium. The qualities of the focus system on the device allows me to work with minimum distances so a bunch of acrylic films will be enough in order to move the focal point several centimeters in the projected image.
5. Study and sketch new and unexpected outcomes based on the first experience. As example I've been thinking on the possibility of a single channel projection, which force the audience to lay on the ground and have a cigarette. That means that the projector, installed as a lamp, beams a single multi-focal point landscape directly to the audience, which is, informally, the smoke generator and the trigger of the experience.



FURTHER

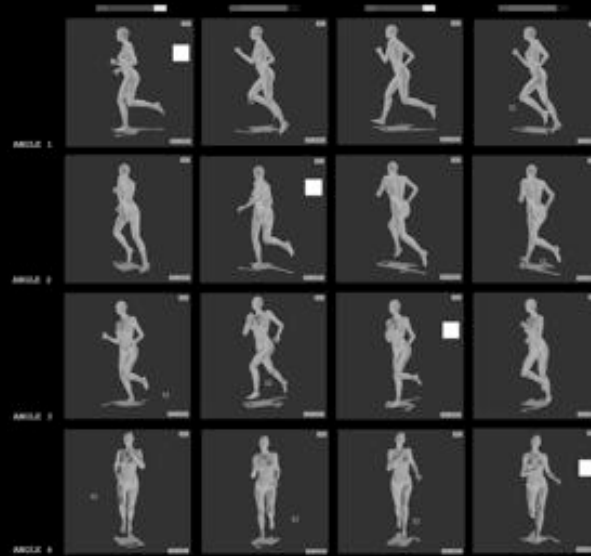


For final project I'm still thinking in a device that condense all the ideas and expectations in a 360 moving image holographic model. Still far away from it I want to show here my first sketches regarding it; I'm interested in apply to it the ideas related to the old zoetrope, but improved in a way that it's able to project a multiple-angle animation loop.

360 HOLOGRAM SMOKE // ZOETROPE

SOURCE: MOVING MODEL ON MULTIPLE ANGLES,
SPINNING ZOETROPE + PROJECTING COLLOCATED LIGHT.
TRIGGERING FRAME AIDS USING STROBE LIGHT AND
ROTATION SPEED.

SELECTIVE TRIGGERING FOR EACH ANGLE???
(MULTIPLE STROBE LIGHT, COLOR FILTERING???)



360 hologram + zoetrope
7 angle moving image
Triggering sequence



First frame 360 angle rotation loop

Second frame 360 angle rotation loop



Single angle animation loop progression

